Report of the External Review Committee

for the Nuclear Science and Engineering Institute

at the University of Missouri

May 7, 2010

Introduction and Charge to the Committee

The University of Missouri (MU) commissioned an external review of their Nuclear Science and Engineering Institute (NSEI) to assist the University's leadership to promote nuclear research and education. NSEI was created as an independent unit reporting to the Graduate School in 2002 and according to the arrangements made at the initiation of the NSEI it was to be externally reviewed after five years. A variety of reasons exist for the delays in conducting this review, but this is the first formal external review of NSEI since 2002. MU clearly has strengths in the many general disciplines related to nuclear science and engineering scattered throughout units across campus including the faculty within NSEI, faculty members in the colleges of Engineering, Science, Medicine, and Health Professions, and in the facilities and capabilities of the MU Research Reactor (MURR), a separate research-focused unit reporting to the Office of Research that is centered around the most powerful university-based research reactor in the country.

The External Review Committee consisting of Andrew Klein, Oregon State University, Jack Brenizer, Pennsylvania State University, and John Gilligan, North Carolina State University prepared for the on-site visit by holding discussions with the Interim Dean of the Graduate School (who was named Dean of the Graduate School on the first day of the Committee's visit to campus), reviewing materials provided by the Dean of the Graduate School and the faculty of NSEI, and reading other publicly available materials such as the University and NSEI websites. The Committee visited campus on April 8 & 9, 2010. The hospitality and collegiality extended by all faculty, staff, and administration at MU both prior to and during the visit was outstanding and greatly appreciated by the members of the External Review Committee. The conversations and discussions by all members of the University community were very useful and helpful to the Committee member's understanding of the situation at MU and in the preparation of this report. The Review Committee members have extensive experience in the management of nuclear facilities, centers and departments, and included a current nuclear engineering Program Chair and former Director for two research reactors, a former Department Head and former Director of a research reactor facility, and a former university Vice Chancellor for Research and Graduate Studies.

The Charge to the Committee is incorporated as an attachment to this report and contains specific directions including:

“We are also interested in evaluating NSEI’s leadership role and impact on national programs beyond the University of Missouri. We would appreciate your candid assessment of NSEI’s current external impact, and the feasibility of NSEI’s future growth plans.”

“Therefore, we ask you to assess the current state of the education, research, service, and economic development programs of the Nuclear Science and Engineering Institute. Is the structure of the Nuclear Science and Engineering Institute aligned with the best opportunity for growth in research and education? Are NSEI's programs currently making effective and extensive use of the campus's human and infrastructural resources? Are there impediments, within the unit or elsewhere on campus, to fulfilling NSEI's potential as a campus-wide program organizing our strengths in nuclear engineering and science? Is NSEI trying to accomplish too much, or too little? Are the right people involved? If you could envision a future in which the campus more effectively marshaled its resources, what would the structure of NSEI look like?”

NSEI Specific Considerations

Strengths

A number of clear strengths and attributes exist within the current relationships and structure for NSEI.

First and foremost, the students in the NSEI's academic programs appear to be well served and supported by the NSEI faculty and staff. All of the graduate students that the External Review Committee visited with are very satisfied with the education they are receiving. They are uniformly appreciative of the opportunities that they have within NSEI, are happy with the support that they receive from the faculty and staff in NSEI and from other units all across campus. Students are concerned; however, that any changes in NSEI could cause degradation in the current level of support that they receive from the NSEI staff and faculty. The students in the Medical Physics Program highly value the education and opportunities that they receive from NSEI and especially value the program's strong linkage with the medical programs at Washington University in St. Louis.

NSEI faculty, staff and students work very hard to maintain the quality and the reputation of the existing graduate degree programs. The five current faculty members in NSEI are extremely productive in teaching two to four courses per faculty per year, obtaining and managing an externally funded research program in the range $2-4 million per year, and working with a graduate student population of approximately 55 graduate students. There is a high coherence of purpose among these five current NSEI faculty and they appear to have strong collaborations with the Schools of Medicine and Health Professions. Both Schools clearly value the efforts of the NSEI faculty to develop and grow the medical physics program and are especially supportive of the efforts to accredit this program as soon as possible.

The University's upper administration values the nuclear engineering, medical physics and the health physics degree programs and express their desire to see these programs grow and strengthen.

Weaknesses

A number of weaknesses were observed that impact NSEI's ability to be truly sustainable and grow in the future.

It was observed that the goals and objectives contained in the original (2002) NSEI charter related to establishing a campus-wide organization where faculty, researchers and staff interested in nuclear science and engineering related research and education come together to build capabilities with outcomes greater than the sum of the parts, have not been

accomplished. In practicality, NSEI has become entirely centered in the five NSEI current faculty members, their research and their academic programs instead of accomplishing goals and objectives aimed at consolidating nuclear science and engineering expertise and capabilities working toward common accomplishments.

There currently is no effective or designated leadership for NSEI and this appears to have been the case since 2006 when the original NSEI interim director retired and stepped away from NSEI. This has led to a variety of outcomes that keep NSEI from being recognized on- and off-campus. This lack of leadership results in a NSEI that is not focused in research and academic direction, does not have any true strategic plan, has no strong national profile or recognition, and no position within the ranks of the nation's nuclear engineering academic graduate programs, such as those listed by the US News and World Report. It has also resulted in the NSEI being essentially isolated as a unit, not a campus-wide integrating institute. NSEI is neither considered by the majority of the individuals who met with the Committee as a true and viable academic unit nor as a true and viable research unit – thus missing the mark on both fronts. Another result of this lack of leadership is that while NSEI core faculty members wish to achieve growth through faculty hires and additional space, it is not apparent how this growth can possibly occur. Their current vision to add 14 faculty members is unrealistic. Any new faculty would require a significant University commitment to NSEI. However, there is no clear direction from the University or NSEI about a significant infusion of resources. The five current faculty, staff and student comments, discussion, and supporting statistics all indicate that the five current faculty have reached, or are very close to reaching, their physical limits and capacities with respect to further growth of the academic and research programs.

Because the current NSEI faculty is so small it is not able to cover all of the traditional nuclear power educational and research areas, and thus some significant areas, such as reactor physics and analysis, thermal hydraulics, safety and design, radiation shielding, and nuclear materials are not well represented. The five current faculty members have been able to provide minimal coverage of these core nuclear power engineering disciplines, but they are stretched to provide coverage of all nuclear power engineering relevant topical areas. The current organization of NSEI, while nominally providing the vehicle for bringing together faculty members from across the university for research and academic programs in nuclear science and engineering, does not have the resources needed to function as an independent institute, keeping NSEI from achieving its goal as being the focused leader of nuclear activities across campus.

NSEI also has a history and recognition across campus that it is a rather dysfunctional organization that has not lived up to its original promise set out through its founding in 2002. Furthermore, there appears to be considerable personal bitterness between the NSEI current faculty and other units and individuals across campus. This has a dual effect of positively

fueling the current NSEI faculty's desire and drive to be successful, i.e. prove their value to the rest of the campus, and negatively alienating others across campus who could help fuel and support their current and future efforts. Unfortunately for NSEI, the negative aspects of these interactions dominate the positive attributes and severely limit future sustainability, growth and productivity of NSEI. This disconnect from the rest of campus and the mistrust of other campus units by NSEI, and vice versa, seriously limits the ability of NSEI to fulfill the vision originally set out for it by the University.

NSEI has no clear draw, such as special laboratory space or equipment that will bring in associated or other faculty. Thus, collaboration is limited to working with individual faculty members on singular projects and other faculty may avoid working with NSEI to stay away from being drawn into political battles. Hence, there are significant parts of campus that are not engaged with NSEI but could be, thus limiting possible agreements on direction, focus, quality, growth, reputation, resources, etc.

Observations

The Committee also made neutral basis observations during the review of NSEI.

The research currently being conducted under the NSEI umbrella is generally based in the broader areas making up nuclear science as opposed to some of the more traditional nuclear engineering areas such as reactor design, reactor analysis, thermal hydraulics, etc. NSEI current faculty strengths are in the areas of aerosols, adsorption, diamond films, diffusion in materials, medical physics, nuclear detection and interaction, health physics, mathematical methods and continuum modeling, and discharges. More than one-half of the students in NSEI graduate academic programs are in non-nuclear energy areas. Many comparator university programs in nuclear engineering and science have dominant research and educational programs corresponding to the core nuclear engineering areas, with additional faculty and research in the peripheral areas, while NSEI has become focused primarily on the peripheral areas. This focus restricts the connectivity of NSEI to the nuclear engineering educational community and results in a lack of national recognition for the NSEI academic programs in nuclear engineering, and the subsequent absence from national rankings.

Another factor that limits the engagement of NSEI with the general nuclear engineering community is the lack of an undergraduate program. Many national activities, including ABET accreditation, are centered at the undergraduate level. In addition, the large numbers of strong BS graduates from other programs who are active in industry and government have a significant influence on an academic program's reputation.

University of Missouri Nuclear Science and Engineering Considerations

A number of clear strengths and attributes exist within the University of Missouri community related to nuclear science and engineering. At present these are all predominantly external to the activities and relationships of NSEI.

Strengths

The MURR is a strong and internationally recognized set of interdisciplinary research, service and business laboratories, facilities, capabilities, and people. MURR's research and service is recognized as the top reactor user facility in the United States housed at a university. MURR is extremely productive, brings great credit to the University, and significantly enhances the national and international reputation of the University. In many ways the nation's nuclear science and engineering community views MURR as the primary focus for nuclear science and engineering activities at the University of Missouri.

The radiochemistry program on campus is strong and unique in its focus on medical applications among similar programs across the country. Only Washington State University and the University of Nevada-Las Vegas have similar size research and academic programs. There are other programs across the country, but they often include only single investigators. The strength at MU is in the number of well-known and respected radiochemists and the opportunities that exist for them through working with MURR.

There are also nuclear-related capabilities and expertise in chemical separations, plasmas, accelerators, pulse power, radiology, etc. spread across departments in the Colleges of Arts and Sciences and Engineering, and in the Schools of Medicine and Health Professions. Many research collaborations do occur among departments and individual faculty members as a result of this expertise and capabilities. These capabilities also provide a unique set of nuclear-related assets that could allow MU's academic and research programs in nuclear science and engineering to be highly ranked, yet they mostly exist as individual researchers, rather than as a collection of like-interests. Collectively these capabilities provide strengths for MU, but most of them are only remotely, if at all, involved in the activities of NSEI.

Weaknesses

A small number of weaknesses were observed that impact MU's collective ability to be truly sustainable and grow its nuclear science and engineering educational and research activities.

The current campus academic and research programs have limited national impact in the areas of expertise of the Review Committee except for certain areas such as radioisotope production and utilization and applications of both MURR's reactor and chemical processing capabilities.

Economic development opportunities exist for the State of Missouri in the applications of nuclear technology and could be exploited, such as attracting outside industry to the region or encouraging the spin off of more start ups from MU. Additionally, there is a strong market for graduates of NSEI in the nuclear power industry in the Southeastern US for those students that select this option.

The aforementioned disconnect of NSEI from the rest of campus and the mistrust of other campus units by NSEI, and vice versa, seriously limit the ability of NSEI to fulfill the MU vision of being viewed as a national leader in nuclear science and engineering. The fractionation of the academic and research groups and an inability to work together as a collective unit has resulted in each group (with the exception of MURR) being below a critical mass. Because parts of campus are not engaged with NSEI, either by choice or simply by lack of knowledge of NSEIs existence, the University finds it very difficult to reach agreement on direction, focus, quality, growth, reputational goals, and resources necessary to fully develop the University's broad capabilities in nuclear science and engineering.

There currently appears to be a "three-way tug-of-war" for the heart and soul of nuclear science and engineering education, research and service at the University of Missouri. By far the strongest of these three players is MURR with its exceptional facilities and staff giving MURR the capabilities for research and growth. The second set of players are the individual faculty members spread across the various academic units on campus in the Colleges of Arts and Science, Engineering, and the Schools of Medicine and Health Professions. As individuals these faculty readily collaborate across campus and across the globe with similar-minded colleagues and bring great credit, recognition, and reputation to the University in their individual areas of research or educational activities. The third set of players, and unfortunately the most vulnerable and least prepared for advancement and growth, is the current faculty within NSEI.

Observations

During our visit, the Committee observed a true sense of frustration from all interested groups that there is much more that could be and should be collectively going on at MU in the general areas of nuclear science and engineering. Faculty members and units all across campus feel that there is an opportunity to advance the University that is being lost, that nuclear science and engineering activities exist all across campus, and the faculty members currently involved in such activities are willing and interested in developing and growing useful academic and research collaborations. Such broadly shared recognition seems to indicate that there is a need at the University for an institute or other administrative structure that would unite these common interests. MURR is clearly a part of this but it is not the organization to provide this University-wide focus point. It should also be noted that expertise in nuclear science and

engineering does exist at the Missouri University of Science and Technology (MUST) and possible interactions are being overlooked or disregarded that could bring significant benefit to the State of Missouri, the region and the nation.

The current NSEI faculty seem happy with their autonomy but not with their limited access to new resources. Other relevant faculty members outside of NSEI seem desirous of working with the NSEI group (autonomy, no undergraduate teaching, etc.) but do not wish to be pulled into the controversial nature of the governance.

Responses to Specific Questions Addressed in Charge to the Committee

Is the structure of the Nuclear Science and Engineering Institute aligned with the best opportunity for growth in research and education?

MU seems to have its collective strengths in nuclear science disciplines and not in the traditional nuclear engineering disciplines. The University leadership must decide if it wants to continue with an emphasis in nuclear science or to move to a more traditional nuclear engineering program with academic strengths in both nuclear engineering and nuclear science. While the research being done both under the auspices of NSEI and outside NSEI is well funded and has been awarded through competitive proposals, there is an absence of the research that is often performed in nuclear engineering departments, such as reactor safety, radiation physics, reactor core modeling and analysis, etc.

There is a need for a strong leader of NSEI, and it may be helpful to reconsider a more traditional academic structure where the academic programs and faculty members active in an institute have their tenure homes in an academic department (or departments) and have NSEI transition to a true research institute, with a Director, support staff, financial management staff, professional research staff, and technicians who provide support, coordinate use of common major research equipment and support major nuclear research. This institute would work with MURR but would not be incorporated in or have oversight of MURR.

The current structure of NSEI, with both academic and research programs and only five faculty members actively engaged in building and growing the reputation of NSEI clouds the view of NSEI from outside the university. The NSEI has been recently successful, but this success has been driven more by the individual successes of senior faculty members than by any structure or collective behavior of the NSEI entity. From the outside, NSEI looks like any other nuclear science and engineering academic unit on other campuses, but is very small compared to other academic programs across the country. Being housed in the Graduate School for the past 8 years has allowed the unit to succeed by the strengths of individual senior faculty members, but further growth and longevity of NSEI does not appear to be sustainable under the current structure.

Are NSEI's programs currently making effective and extensive use of the campus's human and infrastructural resources?

Largely, no. The NSEI laboratory space and the office space seemed to be well utilized by NSEI faculty and students. However, the faculty members in NSEI have become quite isolated from the many other highly successful nuclear science and engineering related entities on campus and have evolved a fairly narrow focus over time. Furthermore, NSEI only really represents and covers a small subset of the many broad areas encompassing nuclear science and engineering.

The current NSEI does not appear to have the resources (facilities, people, or funding) needed to attract nuclear-related activities and associated faculty to close interactions with NSEI. To make effective use of the University's human and infrastructural resources, NSEI must have at its disposal resources that either encourage or entice NSEI to attract campus nuclear-related activities under its umbrella.

Reversing the viewpoint, NSEI has not connected very well with the other nuclear-related resources on campus. There is at least one NSEI faculty member making good use of MURR but this could be increased since there are other faculty members outside of NSEI also working with MURR.

Are there impediments, within the unit or elsewhere on campus, to fulfilling NSEI's potential as a campus-wide program organizing our strengths in nuclear engineering and science?

Yes, the major impediment is the lack of a named Director and the organizational structure within the University. NSEI has been without true leadership for the last four years and previously only had interim leadership. This has led to isolation from the nuclear science and engineering communities both on campus and across the country. While the individual NSEI faculty members work well together and have strong collaborations with individual faculty members in other locations on- and off-campus, the history of nuclear engineering at MU has made it very difficult for the current faculty members to accept change. The organizational structure has allowed the current faculty to exist as an independent entity clearly set apart as a unit from other academic units. Their resulting small size and non-traditional status has prevented them from playing a strong role on campus and in the national arena. While MURR is well known for its accomplishments in radiopharmaceuticals, neutron activation analysis, radiochemistry, etc., NSEI has received very little national recognition as an institute or for its academic programs.

Is NSEI trying to accomplish too much, or too little?

Absolutely too much given their current resources. The NSEI faculty members are trying to cover too many degree programs and disciplines with too few people to fully call themselves a nuclear science and engineering academic and research program. They have been successful individually and even collectively within their own small group, but appear to be too narrowly focused on areas that are peripheral to nuclear science and engineering. Additionally, they do not have sufficient personnel to cover all the areas they already are trying to cover. The workloads are too great and not sustainable.

With the size of the current NSEI faculty and given the lack of strong interactions with other nuclear science activities on the campus (without placing blame for why such strong unit to unit interactions are lacking), it is difficult to see how the five current faculty members can do more

– either by increasing the numbers of students enrolled in its three programs or by increasing their research. They are clearly making it work, but expansion is not possible. If the current resources are not increased, by whatever means the university chooses, the "business as usual" approach is not sustainable.

Are the right people involved?

Yes and no. NSEI clearly needs a strong leader and a more sustainable structure for drawing in adjunct and on-campus colleagues. If they really want to be known as a true nuclear science and engineering institute they need to cover the broad set of disciplines, both traditional and non-traditional within nuclear science and engineering. To a large extent, such faculty members do exist on campus, but do not readily associate themselves with NSEI, preferring to represent their home departments or other research oriented organizations on campus (MURR).

If you could envision a future in which the campus more effectively marshaled its resources, what would the structure of NSEI look like?"

First and foremost, the University must decide what it wants to have as an outcome in nuclear science and engineering education and research. This decision is absolutely critical to determining the direction in which the University would embark and the subsequent actions that the University take to advance and implement this chosen direction. The current state of affairs at the University appears to be defocused and casual, allowing many directions to be considered all at once and at the whim of individuals and small groups. For example, if the decision is to have a highly ranked nuclear engineering program, then a certain set of actions could be taken, or if the desired outcome is a highly recognized research institute, then a very different set of actions is warranted.

A second decision that the University must make is the direction of emphasis within the wide span of interdisciplinary areas available. Two options appear to be; either a traditional nuclear power engineering approach or one that emphasizes more general nuclear science applications. The direction that appears to have been chosen, although it may have been done by default rather than any clear decision making process, is the latter approach. The general nuclear science applications direction might imply eliminating the traditional nuclear engineering degree programs at all levels in favor of nuclear science tracks in other degree programs such as physics, chemistry, chemical, electrical or mechanical engineering and/or within the medical or health professions schools. In the current state budget climate it does not appear that MU on its own can afford to try and do both nuclear power engineering, with traditional nuclear engineering degrees, and the nuclear science approach, and do both well. This will be a critical decision point for the campus.

Given the situation described above the External Review Committee finds that it is impossible to externally define a particular pathway that can move the current NSEI forward to grow in research, academics, resources, space, etc. Thus, in general terms five approaches seem possible for MU with respect to NSEI and the nuclear science and engineering disciplines. **They are not, repeat not, included here in any rank order.** They are randomly ordered and no special interpretation should be given as to which of the five approaches is listed first or last. The most important aspect is that any pathway decision by the University must come only after the above two distinct decisions are made. The options include:

- Leave the situation as is, i.e. with NSEI in the Graduate School and continue/complete the careers of the five faculty members with little additional support from the University. In this approach NSEI would exist for as long as the faculty members continue to be collectively successful as judged by the Dean of the Graduate School to whom they report. A review of NSEI should be conducted every three years to determine the continued viability of NSEI to be successful during the next three year time period. No new tenure-track faculty would be hired to support NSEI and at some point in the future the Dean of the Graduate School would make a determination to either close or modify the mission of NSEI.

- Go back to the original (2002) vision for NSEI and expressly approach all faculty members with interests in the nuclear science and engineering enterprise to renew their relationships with NSEI with the expressed intent on re-invigorating NSEI and provide NSEI with additional resources and faculty (a minimum of three) to begin to achieve the vision for NSEI. A new leader, preferably from the outside, should be recruited and put into place, along with detailed strategic and implementation plans, as soon as possible.

- Re-locate NSEI into either the MU College of Engineering or the College of Science as a new department within the selected college and provide it with entirely new leadership (preferably from the outside), a new direction and fully agreed upon strategic plan with a new and narrowed focus, new and existing faculty from various units across campus, a significant number of new hires (a minimum of 5), but only in those areas specifically designated within the new strategic plan. The new Department could be competitive among the top 15, and possibly higher, Nuclear Engineering programs in the country with only a modest investment of approximately five new faculty members in strategic areas with a new leader. Data has shown that Nuclear Engineering programs with less than 7 faculty members have a difficult time surviving as independent organizations.

- Determine the appropriate academic home for all faculty members who currently have their tenure home within NSEI. Move these faculty members to new academic homes, wherever they may be. Do the same with the current academic programs within NSEI,

moving the programs and the current students, to the appropriate academic units. Then, since it will no longer be an academic program in and of itself, re-form the NSEI within the Office of Research as a true research institute, i.e. a collection of researchers working on common nuclear science and engineering projects and directions, but do not cloud this emphasis on research with academic programs. This approach would go back to the original (2002) research vision for NSEI. The University should approach all faculty members with interests in the nuclear science and engineering enterprise to re-engage their relationships with NSEI with the expressed intent on re-invigorating NSEI. In this approach there would be no faculty members with tenure homes in NSEI and no academic programs residing within NSEI to complicate new research relationships.

- Determine the appropriate academic home for all individual faculty members currently current within NSEI. Move them, as individuals, to these new academic homes, wherever they may be. Terminate all academic programs currently in NSEI, or relocate them to appropriate existing academic units, if there is a new, logical home for each of them. This would be the end of NSEI and its experiment at the University of Missouri.

Recommendations

While MU is analyzing its options and deciding the fate of NSEI, there are some actions that could be taken to help guide the process.

To our knowledge, the situation at the University of Missouri, Columbia is unique and different from the situation and experiences at any other university with nuclear science and engineering programs. The differences and difficulties that have developed and grown during the history of the NSEI now manifest themselves to form a unique problem set. There does not appear to be a singular and clear pathway forward from the current situation to a clear and dominant "solution". Furthermore, any of the possible pathways forward, including any pathways that maintain the status quo, will necessarily include significant pain within the University of Missouri community. However, that said, there are a set of recommendations that the external review committee chooses to put forward, in addition to the answers to the questions posed in the Charter, with the intention of improving and growing the nuclear science and engineering enterprise at the University of Missouri. There is significant research and enrollment growth occurring in the nuclear power areas across the US, and MU must decide if it will capitalize on these trends. Many new nuclear power plants will likely be built in the southeast US that would attract MU nuclear engineering and science graduates at all levels. It is unclear if medical applications of nuclear science currently have the same growth potential.

There are several specific actions that the Committee feels would be useful to the University to strengthen its nuclear engineering and science activities:

- Whatever pathway is chosen for the future of both the NSEI and the nuclear science and engineering enterprises at MU, there is an immediate need to complete a specific NSEI and/or nuclear science and engineering enterprise-wide strategic plan within the next six to twelve months. To accomplish this planning process will require professional strategic planning assistance in order to lead all of the nuclear science and engineering related faculty and others through a thorough process to reach an outcome that is deployable.

- After the strategic planning has been completed, and a clear decision is made with respect to the desired direction for nuclear science and/or engineering, and this decision is communicated to the University it is imperative that the University hire a strong leader to work with the university administration and the existing core and adjunct faculty to implement the University's newly established vision, goals and strategic plan. The cloud of uncertainty surrounding NSEI and the future of nuclear-related research and academic emphasis at MU must be removed before a new leader can be attracted.

- The University should aspire to achieving advanced program accreditation for both the M.S. degree programs in nuclear engineering and health physics through ABET, Inc. in a timely fashion. The best source of initial direction for this activity would include ABET's web site: www.abet.org.

- A strong, external Advisory Committee should be established for NSEI to provide guidance and direction for the Institute's academic and research programs. If NSEI is to remain a separate unit, it would also be wise to have more direct input to the Dean of the Graduate School from other Deans on the goals and direction of NSEI, such as through a Deans and Vice Presidents Council.

- Accreditation of the Medical Physics academic program should be accomplished as expeditiously as possible. The Committee also suggests that the program seek immediate assistance from external experts, perhaps graduates of the MU program who are now associated with accredited Medical Physics programs.

Attachment A. Charge to External Reviewers, March 24, 2010

UNIVERSITY *of* MISSOURI

GRADUATE SCHOOL

Charge to External Reviewers
Nuclear Science and Engineering Institute
March 24, 2010
(For review to take place April 8 to 9, 2010)

The University of Missouri's Nuclear Science and Engineering Institute (NSEI) was created in 2002 as an independent unit reporting to the Graduate School. Faculty strengths in Nuclear Science and Nuclear Engineering at the University of Missouri are combined with the unique resource of the MU Research Reactor (MURR), the most powerful university-based research reactor in the country. We are commissioning an external review of the Nuclear Science and Engineering Institute at MU in order to gain insight into how we might best be able to promote our campus's efforts in nuclear research and education. Our sense is that the combination of the number of interested faculty campus-wide--some of whom are currently involved with NSEI and others who are not--with the resources and staff at MURR should help make nuclear science and engineering a strategic asset of the university.

We are also interested in evaluating NSEI's leadership role and impact on national programs beyond the University of Missouri. We would appreciate your candid assessment of NSEI's current external impact, and the feasibility of NSEI's future growth plans.

Therefore, we ask you to assess the current state of the education, research, service, and economic development programs of the Nuclear Science and Engineering Institute. Is the structure of the Nuclear Science and Engineering Institute aligned with the best opportunity for growth in research and education? Are NSEI's programs currently making effective and extensive use of the campus's human and infrastructural resources? Are there impediments, within the unit or elsewhere on campus, to fulfilling NSEI's potential as a campus-wide program organizing our strengths in nuclear engineering and science? Is NSEI trying to accomplish too much, or too little? Are the right people involved? If you could envision a future in which the campus more effectively marshaled its resources, what would the structure of NSEI look like?

We hope that in the course of your two days on campus you will have a chance to learn about education and research in NSEI and more widely on campus. In addition, we hope that you will produce a report that will be tailored to the strengths on our campus but attuned to the opportunities that you are seeing nationally at your own universities. The University of Missouri wants to ensure that we--and the state and nation--are getting maximum value for our investment in nuclear science across campus. By telling us how we are doing in education, research, service, and economic development, and through suggesting how we might move forward, you will be doing tremendous service to our university and to the discipline.

210 Jesse Hall Columbia, MO 65211-1160 Phone: 573-882-6311 Fax: 573-884-5454

To: George Justice

From: Sudarshan Loyalka on behalf of the NSEI Faculty

Re: NSEI response to Review Committee Report

We are of course very pleased with the Committee's assessment with respect to our students, as educating students and their research training are our main responsibilities. We also appreciate the Committees assessment with respect to the staff support and our faculty. Their assessment,

> "First and foremost, the students in the NSEI's academic programs appear to be well served and supported by the NSEI faculty and staff. All of the graduate students that the External Review Committee visited with are very satisfied with the education they are receiving. They are uniformly appreciative of the opportunities that they have within NSEI, are happy with the support that they receive from the faculty and staff in NSEI and from other units all across campus. Students are concerned; however, that any changes in NSEI could cause degradation in the current level of support that they receive from the NSEI staff and faculty. The students in the Medical Physics Program highly value the education and opportunities that they receive from NSEI and especially value the program's strong linkage with the medical programs at Washington University in St. Louis.
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> NSEI faculty, staff and students work very hard to maintain the quality and the reputation of the existing graduate degree programs. The five current faculty members in NSEI are extremely productive in teaching two to four courses per faculty per year, obtaining and managing an externally funded research program in the range $2-4 million per year, and working with a graduate student population of approximately 55 graduate students. There is a high coherence of purpose among these five current NSEI faculty and they appear to have strong collaborations with the Schools of Medicine and Health Professions. Both Schools clearly value the efforts of the NSEI faculty to develop and grow the medical physics program and are especially supportive of the efforts to accredit this program as soon as possible."

is most gratifying to us. This certainly will be gratifying to all of our students, alumni, colleagues, well wishers, the University, and the state. It is certainly true that we have had a measure of autonomy and support from the Graduate School that we have appreciated and that has contributed to our successes with extramural funding and student interactions and support. Our strong interactions with Wash U Medical School, and support from the deans of the MU medical and health professions schools in further building the medical physics program also potentially provide MU with a strong niche unique in the nation. In our view the path to go forward is to consider immediate appointment of a director (or interim director), work towards additional faculty appointments in partnerships with various units and support from external agencies (Wash U has already stated that they would consider funding a half time

position and NRC Faculty Development grants continue to be available), create draws for faculty from other units on the campus through incentives, etc. It should also be understood that the present NSEI faculty have done their utmost to realize the successes with students, external recognition, and interactions both internal to the campus and externally, and these efforts should be rewarded rather than being continually subjected to demands and processes that at times in our view have been secretive, punitive, discriminatory, and not in the best traditions of good institutions.

We have previously (5/24/2010) provided comments with respect to several factual issues in the report. We had also requested copies of all documents relating to the review that had been provided to the Committee by all parties at MU so that we could comment also on any factual inaccuracies or particular interpretations that these documents might have contained. We understand that these comments and requests were relayed to the Committee. It is our view that our previous comments relating to the factual aspects are substantial, as several of these issues had not been broached by the Committee during their visit and discussions with us, and these should affect materially the analysis and the conclusions reached by it on these issues directly and indirectly on other issues as well. We reiterate these factual issues below with some additional comments:

1. The Ranking of the Unit: This topic had not been brought up at all during the Committee's discussions with us. In the World Ranking Guide, NSEI was ranked 9th among AAU public universities in Nuclear Engineering in 2005 as seen below.

   2005 AAU public universities, Average Assessment Score of Nuclear Engineering Programs

Rank	University	Score
1	Michigan	4.2
2	Wisconsin	4.2
3	Purdue	4.0
4	Texas A&M	4.0
5	Penn State	3.6
6	UC Berkeley	3.6
7	Illinois	3.3
8	Florida	3.2
9	Missouri (MU)	2.7
10	Ohio State	2.6

http://worldranking.blogspot.com/2009/04/us-top-10-nuclear-engineering-schools.html

   The MU College of Engineering (COE) did not provide information to US News with respect to NSEI leading to the omission of nuclear engineering's rankings from 2006-2009. We followed up on the situation with US News and the COE, the information was then provided to US News, and for the first time since 2005, nuclear engineering was considered in the rankings in 2010. Nuclear engineering's current ranking is 16. We have attached some documents relating to the rankings. We also have noted the current relative US News rankings of all MU and MST engineering departments below:

2010 US News and World Report Ranking of Engineering at MU and MST

Department	MU Ranking	MST Ranking
Nuclear Engineering	16	18
Aerospace/Aeronautical	51	43
Bioengineering/Biomedical	71	
Chemical Engineering	87	79
Civil Engineering	73	53
Electrical/Electronic/Communications	98	66
Environmental/Environmental Health	61	51
Industrial/Manufacturing	38	
Mechanical	84	73

It is noteworthy that even with the circumstances we have described, NSEI is the only unit that is ranked above a respective MST program; in all other areas MST is ranked considerably above MU.

The point here is clearly that NSEI has been on the US News rankings map all along, and has been in comparatively much stronger situation than the Committee assumed. The reasons for the shift relate to the administrative actions such as non-submittal of NSEI information to ASEE by the College of Engineering in the interim period (such acts are very damaging to a brand name, and the damage persist for some time), infusion of resources at other comparable nuclear engineering programs in the nation with simultaneous denial of permission to NSEI to compete for NRC Faculty Development grants for new faculty positions, non-appointment of a director (or even an interim director) and loss of that support since 2006.

2. Draw to NSEI: At the time of its formation NSEI was provided 50% of the return on its indirect funds for first five years. This is above the 25% provided to all units on the campus (but is still below the special deal that the engineering dean has, which is 50%-90% on a graduated scale and without any time limit). This return did help NSEI support some projects with some cost matching of faculty proposals from other units on the campus, thus drawing them in collaboration. This return was reduced to 25% in 2007, and our requests for continuation of 50% return were denied. We note that this denial was not based on merit considerations as the NSEI extramural funding has continually increased over the time period, and the University investments in NSEI were being richly awarded.

One very significant draw that we continue to have is the collaboration with faculty from many units on the campus and off campus through adjunct professor appointments in NSEI. These appointments have enabled these faculty members to teach, submit proposals, be members of the graduate faculty, and, advise students. For example, our interactions with Washington

University are strongly reflective of this draw. We have received many positive comments from many of these faculty members, and we wish the Committee had a greater opportunity to discuss this draw from several of these faculty members also.

The greater challenge has been in drawing several faculty members who have tenures in other departments, and who have their own programs (generally with half time appointments at MURR). In these instances, there are issues with respect to assignments of credits on proposals, and their interests and commitments to NSEI. Since the credits reflect on the extramural funding of the departments and their relative standings in the University and externally, and generate Research Incentive Funds (RIF) which are disbursed and used by departments according to their individual policies, the departments understandably have their own reasons not to permit the sharing of credit with NSEI. This creates a circumstance where these faculty members are unable to have a real resource commitment to NSEI, and where their expectations for full faculty governance rights in NSEI in turn become an issue of contention. In our view, in many instances this challenge can be met by creating incentives for these faculty members in mutually supportive ways, and this surely should be explored further. We should note also that in the past extramural grants (with NSEI faculty as PIs) have provided for support of several students in Physics and Chemistry with the faculty there as advisers, and these interactions do need to be mutual.

It is again fair to state that to our knowledge, all departments excepting NSEI itself in an instance of one faculty member whose credits have been shared 50% with MURR since 2006 despite no half time appointment there, insist on full retention of the faculty's credits in their own departments. The burden cannot be all, or mostly on the NSEI or its faculty.

3. Director: The University's Collected Rules and Regulations (CRR210.110, see attachment) also state that the position of Chair (Director) is of great strategic importance for a unit, and that the Director is to be appointed by the Chancellor. We very much wish that a Director or an Interim Director had been appointed upon the retirement of Dr. Wynn Volkert in 2006 (who also had a half time appointment in NSEI), as the tasks of a director are numerous as defined in CRR210.110, and this still should be done with immediate effect. It should also be noted that since 2006, that the faculty (with Prof. Mark Prelas carrying the major share) has conducted most duties of a director as enumerated in CRR210.110 without any extra stipend or summer appointments for anyone.

4. Science Vs Engineering Orientation of Faculty Research: This topic had not been at all brought up by the Committee with us during their visit here, and we did not have a chance to discuss it with them and thus our comments are a bit more extensive. Most of our current major research and educational funding (with NSEI faculty as PIs) has come from the Department of Energy (1 NEER grant, 1 NERI grant, 1 NERI-C grant, 2 NEUP grants awarded last year, a new NEUP grant), the Nuclear Regulatory Commission (2 educational grants, 2 existing and 1 new Graduate Fellowship grant), the Department of Defense (2 grants), and the Department of Labor (1 grant). A large number of our recent publications are in the Nuclear Engineering journals (Nuclear

Technology, Annals of Nuclear Energy). We also have three Department of Education GAANN grants that span both Nuclear Sciences and Engineering (GAANNs are highly competitive and no other nuclear engineering program in the nation or very few departments in the nation have three active GAANN grants). Also our students have regularly made presentations at the American Nuclear Society meetings (publications in transactions). We are doing both nuclear science and engineering, but given the size of our faculty, it has been prudent for us to carve out our niches in both areas and not get in competition with large nuclear engineering programs in traditional areas such as reactor physics, shielding, etc. Our three NRC fellowships grants (a total of about 15 Fellows) however permit us to pursue many of these areas, and we are indeed doing so (for example, our latest NRC Fellowship grant is directed at advanced computations in all nuclear engineering and health physics areas).

We think also that the distinction between science and engineering is increasingly being blurred, and it is possible to have different interpretations of a particular research project(s) without any particular concerns about these interpretations. It is actually our great strength that we do both science and engineering (power), and that our research is at times cross-disciplinary, that we have had good extramural funding even during times that may be are lean in a particular area and that we can be also more forward looking.

5. Interaction with Nuclear Engineering at Missouri Science and Technology (MST): This topic again had not been brought at all by the Committee during our discussions with them. We indeed believe that such interactions would be useful. Actually, former University of Missouri President Elson Floyd had called (2006) for the appointment of a committee to study this matter. We note that a committee was formed based (with a very wide base) on recommendations by the two campus chancellors (MU and MST), it had one organizational meeting, but for reasons that were never communicated formally to any of us (including two of us who were on the Committee) it was not called to meet again by the two co-chairs. It is our view that the if in the future such efforts are explored, and we see value in these, then to achieve a useful outcome, the Committee makeup should focus more on the five core NSEI faculty members and the MST Nuclear Engineering faculty; a very wide base creates confusion and possibly suspicions regarding motivations given the relative sizes and somewhat different cultures of the two campuses.

USNWR Rankings: Nuclear

Number of R&D Awards through NEUP for 09, 10

Ranked in 2010		09	10
1	University of Michigan--Ann Arbor Ann Arbor, MI	4	5
2	University of Wisconsin--Madison Madison, WI	10	5
3	Massachusetts Institute of Technology Cambridge, MA	2	0
4	Texas A&M University--College Station (Look) College Station, TX	5	0
5	Pennsylvania State University--University Park University Park, PA	0	3
	University of California--Berkeley Berkeley, CA	2	2
7	North Carolina State University Raleigh, NC	7	2
8	Georgia Institute of Technology Atlanta, GA	2	1
9	Oregon State University Corvallis, OR	0	0
	University of Florida Gainesville, FL	2	0
	University of Tennessee--Knoxville Knoxville, TN	0	0
12	Purdue University--West Lafayette West Lafayette, IN	0	0
	University of Illinois--Urbana-Champaign Urbana, IL	1	0
14	Rensselaer Polytechnic Institute Troy, NY	2	2
15	Ohio State University Columbus, OH	3	1
16	University of Missouri Columbia, MO	2	2
	University of New Mexico Albuquerque, NM	1	0
18	Missouri University of Science & Technology Rolla, MO	1	0

Others

Idaho State	2	3
Univ. of Idaho	5	0
UNLV	5	2
U Cincinnati	1	2

U. S. News & World Report

America's Best Engineering Schools 2011 Edition
(released April 15, 2010)

02094 University of Missouri

Overall Rank: (out of 192)	86
Overall Score:	24
Academic Reputation Rank/Score (out of 5):	97 / 2.4
Non-academic Reputation Rank/Score (out of 5):	74 / 3
Mean Quantitative GRE Rank:	80
Acceptance Rate Rank:	63
Ph.D. Student/Faculty Ratio Rank:	80
Master's Student/Faculty Ratio Rank:	55
Percent of Faculty Who are NAE Members Rank:	104
Ph.D. Degrees Granted Rank:	94
Average Research Expenditures Rank:	79
Research Expenditures per Faculty Member Rank:	93
Specialty Rankings and Scores	
Aerospace/Aeronautical/Astronautical Rank/Score: (out of 55)	51/2.2
Agricultural/Biological Rank/Score: (out of 28)	Not Applicable
Bioengineering/Biomedical Rank/Score: (out of 94)	71/1.9
Chemical Rank/Score: (out of 125)	87/2.1
Civil Rank/Score: (out of 143)	73/2.4
Electrical/Electronic/Communications Rank/Score: (out of 173)	98/2.3
Environmental/Environmental Health Rank/Score: (out of 95)	61/2.4
Industrial/Manufacturing Rank/Score: (out of 74)	38/2.4
Materials Rank/Score: (out of 92)	Not Applicable
Mechanical Rank/Score: (out of 163)	84/2.4
Nuclear Rank/Score: (out of 27)	16/2.4

Please visit http://www.usnews.com/articles/education/best-graduate-schools/2010/04/15/how-we-calculated-the-2010-graduate-school-rankings.html for an explanation of the ranking methodology. If you have any questions about your detailed ranking, contact Robert Morse at 202-955-2389 or rmorse@usnews.com.

1050 Thomas Jefferson Street, N.W., Washington, DC 20007-3837

Tel: 202-955-2000

U.S. News Online: http://www.usnews.com/education

First Previous Next Last

Engineering Specialties: Nuclear

New! Ranked in 2005*

Rank	School	Average assessment score (5.0=highest)
1.	Massachusetts Institute of Technology	4.5
2.	University of Michigan-Ann Arbor	4.2
	University of Wisconsin-Madison	4.2
4.	Purdue University-West Lafayette (IN)	4.0
	Texas A&M University-College Station (Look)	4.0
6.	North Carolina State University	3.7
7.	Pennsylvania State University-University Park	3.6
	University of California-Berkeley	3.6
9.	Oregon State University	3.4
10.	University of Illinois-Urbana-Champaign	3.3
	University of Tennessee-Knoxville	3.3
12.	University of Florida	3.2
13.	Georgia Institute of Technology	3.0
14.	University of Missouri-Columbia	2.7
15.	Ohio State University	2.6
16.	Rensselaer Polytechnic Institute (NY)	2.5

* This ranking was computed in January of the year cited, based on data from a survey sent out in the fall of the previous year.

Loyalka, Sudarshan K.

From: Ghosh, Tushar K.
Sent: Monday, May 17, 2010 5:12 PM
To: Loyalka, Sudarshan K.
Subject: FW: Notes and Data on Manring Note
Attachments: 4a53V2-12.pdf; 4a53V2-12.pdf

Check Drobney's note (internal assessment?), where he noted that based on our performance in the following year we should have ranked higher if we were considered.

Tushar

Tushar K Ghosh, PhD
Professor and Director of Graduate Studies
Nuclear Science and Engineering Institute
E 2438 Lafferre Hall
Columbia, Missouri, 65211
Ph: (573) 882-9736; Fax: (573) 884-4801
Website: http://nsei.missouri.edu

From: Prelas, Mark A.
Sent: Wednesday, March 03, 2010 10:47 AM
To: Ghosh, Tushar K.; Loyalka, Sudarshan K.
Subject: FW: Notes and Data on Manring Note

Mark A. Prelas
Director of Research
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Fax: +(573) 884=4801
E-Mail: prelasm@missouri.edu
Web Page: http://prelas.nuclear.missouri.edu

From: Prelas, Mark A.
Sent: Wednesday, April 05, 2006 2:46 AM
To: Volkert, Wynn
Subject: Notes and Data on Manring Note

I have provided information from US news and world report that shows that NSEI was not even considered for the rankings because it was not listed in the ASEE data base for graduate engineering programs. I have also provided my note to Ron Drobney which states that COE was responsible for reporting engineering data to the rating organizations and did not provide data for NSEI and Manring's note to the Chancellor, Provost, upper administration and COE faculty.

Mark A. Prelas
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From: Prelas, Mark A.
Sent: Tuesday, April 04, 2006 9:21 AM
To: Drobney, Ronald D.; Manring, Noah D.
Cc: Viswanath, Dabir S. (Emeritus); Loyalka, Sudarshan K.; Miller, William H.; Ghosh, Tushar K.; Tompson Jr, Robert V.; Volkert, Wynn
Subject: FW: Reader Feedback: College Premium Online Edition

To: Ron Drobney

These are the specifics as to why were not ranked in US News and World report. We were not even considered because NSEI's information was dropped from the ASEE publication on graduate schools because it was never provided to ASEE.

Mark A. Prelas
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E-Mail: prelasm@missouri.edu
Web Page: http://prelas.nuclear.missouri.edu

From: Ghosh, Tushar K.
Sent: Tuesday, April 04, 2006 9:15 AM
To: Prelas, Mark A.; Loyalka, Sudarshan K.; Miller, William H.; Volkert, Wynn; Tompson Jr, Robert V.; Viswanath, Dabir S. (Emeritus)
Subject: FW: Reader Feedback: College Premium Online Edition

Here is my correspondence with US NEWS. As you will note, we were not even considered for ranking this year as our information was not included in ASEE. We were taken out of the ASEE without telling us.

tushar

From: Morse, Bob [mailto:RMORSE@usnews.com]
Sent: Tuesday, April 04, 2006 7:56 AM
To: Ghosh, Tushar K.
Subject: RE: Reader Feedback: College Premium Online Edition

this is the survey instrument
your school/program wasn't listed
USNEWS got the names for the American Society for Engineering Education http://www.asee.org/
contact was Mike Gibbons

does this answer your question?

Robert J. Morse
Director of Data Research
U.S. News & World Report
1050 Thomas Jefferson St. NW
Washington, DC 20007

Phone: 202-955-2389
Fax: 202-955-2263
www.usnews.com

-----Original Message-----
From: US NEWS Webmaster
Sent: Monday, April 03, 2006 10:20 PM
To: Morse, Bob
Subject: FW: Reader Feedback: College Premium Online Edition

From: ghosht@missouri.edu [mailto:[Robert Morse]]
Sent: Mon 4/3/2006 12:48 PM
To: US NEWS Webmaster
Subject: Reader Feedback: College Premium Online Edition

Would you please let me know, if the Nuclear Engineering at the University of Missouri-Columbia was considered during 2006 ranking of the Nuclear Engineering Programs. Since we did not receive any request of information prior to ranking.

thanks

Manring note and other information.

Mark A. Prelas
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From: Prelas, Mark A.
Sent: Tuesday, April 04, 2006 8:28 AM
To: Ghosh, Tushar K.; Viswanath, Dabir S. (Emeritus); Loyalka, Sudarshan K.; Miller, William H.; Tompson Jr, Robert V.; Loyalka, Sudarshan K.; Volkert, Wynn
Subject: FW: College of Engineering Rankings ...

FYI

Mark A. Prelas
Director of Research

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From: Drobney, Ronald D.
Sent: Tuesday, April 04, 2006 8:11 AM
To: Prelas, Mark A.
Cc: Manring, Noah D.
Subject: RE: College of Engineering Rankings ...

Mark

I am sorry that the Nuclear Science program information was not included in the U.S. News Rankings because I am sure that your program would be highly ranked based upon the performance last year. I hope that you will work closely with those in COE who are tabulating the data for the report to ensure that you are aware of the deadlines for submission next year.

Let me know if there is anything I can do to help.

Ron

From: Prelas, Mark A.
Sent: Monday, April 03, 2006 11:48 AM
To: Drobney, Ronald D.; Benoit, Pamela; Coleman, James S.; Foster, Brian L. (Provost)
Cc: Ghosh, Tushar K.; Viswanath, Dabir S. (Emeritus); Loyalka, Sudarshan K.; Tompson Jr, Robert V.; Miller, William H.; Volkert, Wynn
Subject: FW: College of Engineering Rankings ...

To: Ronald Drobney
Regarding: US News and World Report Rankings

I did get a copy of the note shown below regarding US News and World Report Rankings.

As you know from communications from me last fall, I was concerned that information regarding the NE program was not being forwarded to US News and World Report and other organizations gathering data. I believe as a result of these communications that we did find out that US News and World Report and other organizations were getting its information on engineering programs at MU from the College of Engineering. We also found out that the college of engineering did not provide any information to these organizations regarding the NSEI program.

Given that our performance has only improved every year since the inception of NSEI, I would suspect that the US News and World Report Rankings would have improved if the appropriate information had been made available. As I understand the current situation, the College of Engineering will in the future provide US News and World Report with NSEI data.

I appreciate your help and attention to this issue.

Mark Prelas

Mark A. Prelas
Director of Research
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Web Page: http://prelas.nuclear.missouri.edu

From: Manring, Noah D.
Sent: Saturday, April 01, 2006 9:00 AM
To: UMC ENGR MU Faculty; UMC ENGR MU Staff
Cc: Coleman, James S.; Foster, Brian L. (Provost); Deaton, Brady (Chancellor); Drobney, Ronald D.; Benoit, Pamela; Nichols, Michael F.; Warnock, Michael J.; Dean, Kenneth D.
Subject: College of Engineering Rankings ...

COE Faculty and Staff:

The 2007 US News & World Report ranking for America's Best Graduate Schools is out. Good News! **The College of Engineering has been ranked for the fist time in this listing**. We are now ranked 93rd with Texas Tech and Worcester Polytechnic Institute.

Congratulations to each one of you who have made this possible. Now that we are on the list, our goal is to >increase< our rankings! (Rolla is ranked 68th and Washington University is ranked 33rd.)

P.S. In the specialty rankings, we are ranked 71st in Mechanical Engineering and 74th in Civil Engineering. Our other departments remain unranked. UMC is no longer ranked in Nuclear Engineering.

Noah D. Manring, Ph.D.
Associate Dean for Research
College of Engineering
University of Missouri -- Columbia
Columbia, MO 65211
(573) 884-4457

Collected Rules and Regulations

Administration

Chapter 20: Organization

20.110 Department Chair

Executive Guideline No. 7, 2-2-73, Revised 7-14-08.

A. In those schools or colleges which have departments, or on campuses having no schools or colleges but which have departments, that unit is or becomes the primary unit of education and administration within the University of Missouri. This statement is not intended to promote the creation of departments where the educational function is not served by such a change in the organizational pattern. The Department Chair is in a position of great strategic importance because the department is the organizational unit closest to the day-to-day working of the University. The Chair is the chief executive and academic officer of the department. The Chair is responsible, within the Rules and Regulations of the University, the rules of the campus, and the rules of the college or school where they exist and department, for the effective and efficient administration of the department.

B. The Chair is responsible for providing leadership toward the achievement of excellence in teaching, research, extension and service activities of the department. He/she is responsible for representing the needs and aspirations of the department to the rest of the University. He/she is responsible to the Dean or on campuses having no deans, to the Provost, and also to his faculty for conducting the fiscal, academic, and personnel affairs of his department. He/she must diligently attempt to do these things in a manner that will make the most efficient and beneficial use of the resources available whether they be financial, physical, or human. He/she must develop, improve, and execute departmental policies and procedures in harmony with campus, school, or college (on campuses having schools or colleges), and University policies. The Chair will have such authority as is required to accomplish these responsibilities.

C. Chairs are appointed by the respective chancellors upon the recommendation by the dean of the school or college or on campuses having no schools or colleges, by the Provost, after consultation with the departmental faculty. The term of office of a chair is specified by appointing authority. The appointment is subject to periodic review by the department faculty and the dean, or on campuses having no schools or colleges, by the Provost. Responsibilities of the chair are continuous throughout the year. The position of chair should be compensated in some manner and appropriate to the added responsibilities.

D. As principal executive officer of the department, the Chair has a variety of planning and management functions, and should seek the counsel of his staff and delegate duties when possible. In addition, as a faculty member, he/she is expected to participate in the department's teaching, research, and extension activities.

E. The position of Chair carries financial obligations associated with the responsibilities of the office, in connection with travel, recruiting, providing for distinguished visitors, etc. Whenever possible, funds in a special account should made available by the dean of the college or division to be used at the discretion of the dean within guidelines provided, or on campuses having no deans, schools or colleges, by the Provost.

F. Departments may be provided with special administrative assistance to relieve the Chair from routine chores. Justification of this assistance should be based on such problems as large departmental hourly payrolls, complicated laboratory facilities, large student enrollments, extensive curatorial responsibilities, and major committee responsibilities of the staff.

G. **Check List of Typical Activities of Departmental Chair at the University of Missouri** -- The sole purpose of the following list is to aid chairs and their assistants in organizing various departmental duties. This list is not intended to supersede general University guidelines for department chairs. Further it is understood that this suggested list of responsibilities will involve appropriate faculty consultation and participation.

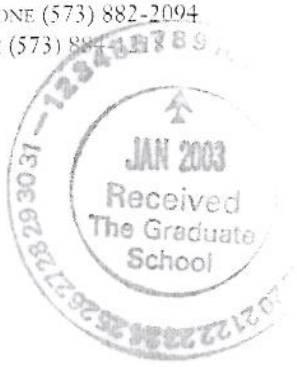
1. **Fiscal** -- Prepare departmental budget requests. Supervise the expenditure of funds allocated to the department (or school) and the assignment of space, facilities, equipment, and supplies.
2. **Staff** -- Recruit, recommend for appointment, orient and evaluate faculty members, research associates and assistants, teaching associates and assistants, and other staff. Prepare recommendations for reappointments, promotions, changes of status, salary changes, leaves of absence, tenure, fellowships, associateships, and

assistantships for the faculty and non-teaching staff. Promote the scholarly growth of the department through the presentation of speakers, initiation of new research, attendance of staff at scholarly meetings, etc.

3. **Teaching** -- Review and propose improvements in departmental (or school) curricula and courses, and plan for the future year-round needs and development of the department (or school). Provide supervision for Extension Division or Continuing Education classes, including approval of courses and instructors. Organize and assign teaching schedules for maximum effectiveness and efficiency. Improve the quality of teaching of both permanent staff and teaching assistants.
4. **Students** -- Develop and supervise sound academic advising for students. Review applicants for admission to graduate studies in the department. Transmit grades of all students who have taken courses in the department to the Office of the Registrar.
5. **Miscellaneous** -- Work with the Director of Libraries on the improvement of the collection of books for teaching and research purposes; maintain an acceptable public service; answer general inquiries by students, staff and public in general; respond to directives, requests, and questionnaires generated by committees, student groups, administrators, public organizations, and professional societies.

University of Missouri-Columbia
MU Budget Office

305 Jesse Hall
Columbia, Missouri 65211
PHONE (573) 882-2094
FAX (573) 884-6789



January 8, 2003

To: Suzanne Ortega, Rob Hall

From: Tim Rooney

RE: Nuclear Science & Engineering Institute

This memo is to follow up on our recent discussion regarding the establishment of the Nuclear Science & Engineering Institute (NSEI). We agreed it would be useful to summarize our understanding in regards to any promises or funding commitments specifically made or implied to the NSEI. The following is a list of items that reflect our understanding of the situation at this point in time.

1. The NSEI was formally established as of November 18, 2002, which is the date of Chancellor Wallace's memo to Vice President Lehmkuhle regarding the creation of this unit.

2. The Chancellor approved the establishment of the NSEI on a provisional 3 year basis. That is indicated in the Chancellor's November 4, 2002 letter to Dr. Volkert.

3. Continuation of the NSEI beyond the provisional 3 year period is dependent upon the institute's ability to be self sufficient through a combination of extramural funding, self generated funding, or GO rate dollars transferred from the College of Engineering. This is outlined in the November 4th letter.

4. If the institute is not self supporting at the end of the 3 year period, it will be phased out within a 2 year period which would be consistent with the 5 year review cycle for the institute. This is also outlined in the November 4th letter.

5. The Chancellor has committed institutional funding of $40,000 to support the relocation of professor Mark Prelas' research lab to space in the Student Health Center. Again, this is stated in the November 4th letter.

6. Although not specifically stated in writing in any document, there is an institutional commitment to fund an appropriate portion of Dr. Volkert's salary for his directorship of the NSEI. The Chancellor's November 4th letter states that he would consider a search, and MU funding, for a full-time, permanent director if the Institute continues to be viable after the first 3 years.

7. The RIF calculation for the NSEI will be the same enhanced RIF calculation that the College of Engineering currently enjoys. However, this enhanced RIF calculation will be effective for 5 years only, after which NSEI will receive the normal RIF distribution as all other units on the MU campus.

8. The current RIF funds are already totally committed to a staff person hired by Dr. Volkert and for E&E commitments to be incurred by Dr. Volkert.

9. There is a $14,000 salary commitment that was made to the Department of Chemistry that has not been met. There is disagreement as to whether this should be a commitment of the Dean's Office of the College of Engineering or should be a commitment of the NSEI. The commitment was made by Dean Thompson although it was made on behalf of the Nuclear Engineering Department at that time. This is still an unresolved issue.

10. There are 2 nuclear engineering students who are MAGEP fellows. The Graduate School office has determined that the financial commitments made for these 2 assistantships were made by Nuclear Engineering faculty: Dr. William Miller and Dr. Tushar Ghosh. Therefore, it is our belief that any financial commitment for these MAGEP fellows is a responsibility of the NSEI and not the College of Engineering.

By copy of this memo, I will inform the Chancellor and Provost of this information and invite them to contact me if they have any concerns with the above information. Also, I will follow-up with Brady on the unresolved item described in number 9 above.

TR:mr

CC: Chancellor Wallace
Provost Deaton

Ortega

Office of the Chancellor
University of Missouri-Columbia

105 Jesse Hall
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November 4, 2002

Professor Wynn Volkert
Interim Director, Nuclear Science and Engineering Institute
Curators' Professor of Radiology, Chemistry & Biochemistry
123 Major Hall

Dear Professor Volkert:

Attached please find a copy of my memo notifying Steve Lehmkuhle, at the University of Missouri System office, to add the Nuclear Science and Engineering Institute to the inventory of UM centers. I sincerely appreciated Provost Brady Deaton's thoughtful letter of September 4, outlining his recommendations with regard to the creation of the Institute. I also appreciated the subsequent chance to discuss his letter and your response to it. To reiterate what we discussed and decided at our meeting of October 11, 2002 with regard to creation of the institute:

1) Because you made a compelling case that inclusion of the word "engineering" in the title of the new institute would substantially enhance the efforts of Institute faculty to secure competitive extramural funding, the Institute will be designated as **The Nuclear Science and Engineering Institute (NSEI)** in the center inventory.

2) Per all of our early discussions, the future of the NSEI depends on its capacity to become self-supporting. For that reason, I am approving the establishment of the Institute on a provisional three year basis. The requirement for continuation of the NSEI beyond the initial three year period is its ability to fully support all of Institute operational expenses through a combination of extramural or self-generated funds and the **rate** dollars transferred to the Institute directly from the College of Engineering. As we discussed, and particularly in light of our current very challenging budgetary circumstances, the expectation is that no additional cost or rate dollars will be provided to the Institute past the initial three year start-up period. If the Institute is not financially viable at the end of that period, it will be disbanded not later than the point at which the normal five year center review would occur. This will allow approximately two years for faculty with continuous appointments in the NSEI to explore possibilities at MU for alternative and mutually acceptable academic homes.

Although the basic premise for establishing the Institute is that no new MU resources will flow to NSEI, I am convinced that the Institute has great potential. If the Institute were to succeed in securing a large center grant from the U.S. Department of Energy, for example, I remain open to the possibility of discussing the search for a full-time, permanent director. At that point, I realize a commitment of additional MU rate dollars may be necessary and I will be willing to explore possibilities for such support, especially if there are ways to creatively combine administrative responsibilities, perhaps between NSEI and the Reactor.

3) I am very optimistic about the future of the NSEI and fully expect it to become a vital part of the research infrastructure and mission of MU. If, however, the Institute were disbanded on the basis of a negative administrative review, the reassignment of tenured faculty to other academic units will follow the policy found in section 320.150 of the Collected Rules. Thus, the University, with faculty participation, will attempt to place all current and future faculty with continuous appointments in the NSEI in another appropriate position in the University system. Tenured faculty are any university's most valuable resource. Please know that were the Institute to be dissolved, we will make every effort to work with those faculty to find mutually agreeable academic homes.

On a slightly different note, at this time, I am also asking Provost Brady Deaton to work with the MU budget officer to identify institutional funds, not to exceed $40,000, to support the relocation of Professor Mark Prelas' research lab from its current space in the College of Engineering to assigned NSEI space in the Student Health Center.

I look forward to working with you on the continuing development of this promising new institute.

Sincerely yours,

Richard

Richard L. Wallace
Chancellor

RLW/td
attachment
c: Brady Deaton, Provost
Suzanne Ortega, Vice Provost and Dean
Robert Hall, Interim Vice Provost